Our Ref. No.: 005513.P018

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application for:	)	
	)	Examiner: Le, Thao X.
Michael C. Green et al.	)	
	)	Art Unit: 2814
Serial No. 10/665,298	)	
	)	
Filed: September 17, 2003	)	
	)	
For: REDUCING DARK CURRENT OF PHOTOCONDUCTOR USING HETEROJUNCTION THAT MAINTAINS HIGH X-RAY SENSITIVITY	)	

ATTACHMENT A
DECLARATION OF MICHAEL C. GREEN
PURSUANT TO 37 C.F.R. §1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Michael C. Green, hereby declare that:

1. I am a citizen of the United Kingdom.

2. I currently reside at 4055 Manzana Lane, Palo Alto, California, 94036.

3. I am currently an employee at Varian Medical Systems, Inc. (VMS, Inc.) in Mountain View, California.

4. I was employed by VMS, Inc. from 2001 to present.

5. My current title at VMS, Inc. is Senior Scientist.

6. I am a co-inventor of the above-identified patent application.

7. Varian Medical Systems Technology, Inc. (VMST, Inc.) is the assignee of the above-identified patent application. VMST, Inc. is a wholly owned subsidiary of VMS, Inc.

8. The Examiner has cited part of U.S. Patent No. 6,995,375 B2 issued to Sato, et al. ("Sato") filed June 30, 2003, issued February 7, 2006, and having a priority date of August 30, 2002 based on Japan Patent Application 2002-253819 against the claims (of the above identified application). (The Examiner has cited Sato, along with other references, in anticipation and obviousness type rejections against the claims).

9. I have reviewed the invention disclosed and currently claimed (as shown by the attached Current Claims) of the above-identified patent application of which I am an inventor. The invention disclosed and currently claimed in the above-identified patent application was conceived in the United States of America at least as early as July 23, 2002, as evidenced by **Attachment E - Varian Medical Systems Disclosure of Invention**, having identification number D2002-027 (the "document" a copy of which is attached herein). This document was reduced to writing internally within VMS, Inc. at least as early as the date on the document, i.e. July 23, 2002. The document demonstrates conception of the claimed invention of the instant application and was prepared under my and the other inventor's direction based on our own original work.

The invention disclosed and currently claimed was actually reduced to practice in the United States at least as early as November 14, 2002 as evidenced by **Attachment F - Email RE: RMD PbI2-HgI2 samples**, sent November 14, 2002, from Raisa Pavlyuchkova to George Zentai; and attachment thereto **Attachment G - Graphs of Dark Current, Sensitivity, and Signal**. The email and graphs of attachments F-G were created and reduced to writing internally within VMS, Inc. at least as early as July 23, 2002. Those images and documents demonstrate conception and actual reduction to practice of the invention of the instant application and were prepared under the direction of the inventors of the instant application, including myself, on our original works. Specifically, the email and graphs pertain to actual reduction to practice of Reducing Dark Current of Photoconductor Using Heterojunction That Maintains High X-Ray Sensitivity by evidencing actual test results of devices according to the claims of the above-identified patent application. For example, Attachments F and G show and sufficiently test the

claim 1 requirements of a photodetector (see the example of Sensitivity and Signal (e.g., detector response) graphs of Attachment G) comprising a heterojunction of first and second semiconductor materials being halides, wherein at least one of the first and second semiconductor materials consists of a semiconductor material (see the example of a first material of PbI2 and second material of HgI2, as noted in the Subject line and text of Attachment F; and as evidenced by text, legends, column headings, and test results of Attachment G). Also, Attachments F and G show and sufficiently test the claim 30 requirements of a contact coupled to the second semiconductor material (a contact is required for the example graphs of Attachment G), wherein the first and second semiconductor materials comprise means for reducing a chemical reaction with the contact (see the example of a first material of PbI2, a second material of HgI2, and a contact, as noted above); and means for reducing dark current in the heterojunction structure (see the example Dark Current graph of Attachment G). Likewise, Attachments F and G show and sufficiently test the claim 31 requirements of wherein the second semiconductor material is less corrosive than the first semiconductor material to the contact (see the example of a first material of PbI2, a second material of HgI2, and a contact, as noted above). Finally, Attachments F and G show and sufficiently test the claim 49 requirements, such as noted above for claim 1.

In addition, between at least as early as July 23, 2002 and its actual reduction to practice as noted above on November 14, 2002, the inventors of the instant application, including myself, directed simulations and various testing in a diligent effort to reduce the invention to practice, as evidenced by **Attachment H - Page of Laboratory Notebook of Paul Bennett**, showing testing results for HgI2 deposited on PbI2 at the entry for September 27, 2002. The entries to Paul Bennett`s laboratory notebook (Attachment H) were prepared under the direction of the inventors of the instant application, including myself, on our original work. The laboratory notebook (Attachment H) pertains to due diligence between conception and actual reduction to practice of Reducing Dark Current of Photoconductor Using Heterojunction That Maintains X-Ray Sensitivity as claimed in the above identified patent application. Therefore, the conception, due

diligence to its actual reduction to practice, and actual reduction to practice of the invention disclosed and claimed in the above-identified patent application support a date of invention of July 23, 2002, which is prior to the priority date of Sato (August 30, 2002).

Furthermore, between at least as early as July 23, 2002 and its constructive reduction to practice by filing the above-identified patent application on September 17, 2003, the inventors of the instant application, including myself, directed simulations, various testing, and worked on the patent application in a diligent effort to reduce the invention to practice, as evidenced by Attachments F-H.

Hence, as evidenced by Attachments F-H, the inventors of the instant application, including myself, were diligent from at least as early as July 23, 2002, in reducing the invention as claimed to practice both in actual reduction to practice, and in constructive reduction to practice (by filing the patent application on September 17, 2003, within two months of conception).

10. The excerpts provided herewith are designated "Confidential" and/or are VMS, Inc. Confidential memos and documents. It is VMS, Inc.'s practice to maintain in secrecy all VMS confidential internal memos or documents designated "Confidential." I believe that the images and documents from which these excerpts come have, at all times prior to the filing date of the above-captioned application, been maintained in a confidential manner.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-identified application or any patent issued thereon.

Respectfully submitted,

Dated: 19th July, 2007

Michael C. Green

Michael C. Green

Full Name:	Michael C. Green
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Attachment: Current Claims

CURRENT CLAIMS

1. (Previously Presented) A photodetector, comprising:

a plurality of semiconductor materials forming a heterojunction, the plurality of semiconductor materials comprising:

a first semiconductor material;

a second semiconductor material coupled to the first semiconductor material, the first and second semiconductor materials being halides, wherein at least one of the first and second semiconductor materials consists of a semiconductor material.

2. (Original) The photodetector of claim 1, wherein the first and second semiconductor materials have approximately the same band gap.

3. (Original) The photodetector of claim 1, wherein the first semiconductor material comprises an iodide compound and the second semiconductor material comprises mercuric iodide.

4. (Original) The photodetector of claim 3, wherein the first semiconductor material comprises lead iodide.

5. (Original) The photodetector of claim 1, further comprising:

a first contact; and

a second contact, wherein the first plurality of semiconductor materials are disposed between the first and second contacts.

6. (Original) The photodetector of claim 5, wherein at least one of the first and second contacts comprises palladium.

7. (Original) The photodetector of claim 5, wherein the second semiconductor material comprises mercuric iodide and the first semiconductor material is less chemically reactive than mercuric iodide with the contacts.

8. (Original) The photodetector of claim 1, wherein the second semiconductor material is thicker than the first semiconductor material.

9. (Original) The photodetector of claim 8, wherein the first semiconductor material has a first thickness less than approximately 250 microns.

10. (Original) The photodetector of claim 9, wherein the first semiconductor material has a first thickness less than approximately 50 microns.

11. (Original) The photodetector of claim 4, wherein the second semiconductor material is thicker than the first semiconductor material.

12 (Original) The photodetector of claim 11, wherein the first semiconductor material has a first thickness less than approximately 250 microns.

13. (Original) The photodetector of claim 12, wherein the first semiconductor material has a first thickness less than approximately 50 microns.

14. (Original) The photodetector of claim 4, wherein the plurality of semiconductor materials further comprises a third semiconductor material comprising lead iodide coupled to the second semiconductor material.

15. (Original) The photodetector of claim 14, wherein the third semiconductor material has a third thickness less than approximately 50 microns.

16. (Original) The photodetector of claim 1, wherein the second semiconductor material has a conductivity type different than the first semiconductor material.

17. (Original) The photodetector of claim 16, wherein the band gaps of the first and second semiconductor materials are within 10 percent of each other.

18. (Previously Presented) The photodetector of claim 17, wherein the first semiconductor material comprises mercuric iodide and the second semiconductor

material comprises lead iodide and each of the first and second semiconductor materials consists of a semiconductor material.

19. (Original) The photodetector of claim 18, wherein the second semiconductor material is thicker than the first semiconductor material.

20. (Original) The photodetector of claim 18, wherein the plurality of semiconductor materials further comprises a third semiconductor material comprising lead iodide coupled to the second semiconductor material.

21. (Original) The photodetector of claim 1, wherein at least one of the first and second semiconductor materials comprises an iodide compound and wherein the first semiconductor material comprises bismuth iodide.

22. (Original) The photodetector of claim 21, wherein the second semiconductor material comprises mercuric iodide.

23. (Previously Presented) The photodetector of claim 21, wherein the second semiconductor material comprises lead iodide.

24. (Original) The photodetector of claim 1, wherein one of the first and second semiconductor materials comprises an iodide compound and the other of the first and second semiconductor materials comprises thallium bromide.

25. (Original) The photodetector of claim 24, wherein the one of the first and second semiconductor materials that comprises an iodide compound further comprises mercuric iodide.

26. (Original) The photodetector of claim 24, wherein the one of the first and second semiconductor materials that comprises an iodide compound further comprises lead iodide.

27. (Original) The photodetector of claim 1, wherein the photodetector is coupled to a negative bias.

28. (Original) The photodetector of claim 5, wherein the first contact is coupled to ground and the second contact is coupled to a negative voltage.

29. (Original) The photodetector of claim 8, wherein the first contact is coupled to ground and the second contact is coupled to a negative voltage.

30. (Previously Presented) A photodetector, comprising:

a first semiconductor material;

a second semiconductor material coupled to the first semiconductor material forming a heterojunction structure, wherein at least one of the first and the second semiconductor materials consists of a semiconductor material;

a contact coupled to the second semiconductor material, wherein the first and second semiconductor materials comprise means for reducing a chemical reaction with the contact; and

means for reducing dark current in the heterojunction structure.

31. (Previously Presented) A photodetector, comprising:

a first semiconductor material;

a second semiconductor material coupled to the first semiconductor material, wherein at least one of the first and the second semiconductor materials consists of a semiconductor material; and

a contact coupled to the second semiconductor material, wherein the second semiconductor material is less corrosive than the first semiconductor material to the contact.

32. (Original) The photodetector of claim 31, wherein the first and second semiconductor materials are halides.

33. (Original) The photodetector of claim 32, wherein the first and second semiconductor materials comprise iodide.

34. (Original) The photodetector of claim 33, wherein the first semiconductor material is lead iodide.

35. (Original) The photodetector of claim 34, wherein the second semiconductor material is mercuric iodide.

36. (Original) The photodetector of claim 33, wherein the second semiconductor material is mercuric iodide.

37. (Original) The photodetector of claim 33, wherein the first semiconductor material is bismuth iodide.

Claims 38-48 (Canceled)

49. (Previously Presented) A photodetector, comprising:

a plurality of semiconductor materials forming a heterojunction, the plurality of semiconductor materials comprising:

a first semiconductor material; and

a second semiconductor material coupled to the first semiconductor material, the first and second semiconductor materials consisting essentially of halides, wherein at least one of the first and second semiconductor materials consists essentially of a semiconductor material.

50. (Previously Presented) The photodetector of claim 49 wherein the first semiconductor material is lead iodide and the second semiconductor material is mercuric iodide.